

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 10/052,966
Applicant(s) : Mu-Il Lim et al.
Filed : January 18, 2002
Art Unit : 1611
Examiner : Lakshmi Sarada Channavajjala
Confirmation No. : 3345
Docket No. : G-271ML
Customer No. : 27752
Title : Novel Coupler for Use in Oxidative Hair Dyeing

DECLARATION

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I, Mu-Il Lim, do hereby declare as follows:

- 1) I received a B.A. in Chemistry from Korea University in Seoul, Republic of Korea, and a Ph.D. in Organic Chemistry from McGill University in Montreal, Canada. I have been employed by The Procter & Gamble Company as a Principal Scientist from 2002 until present. Before that, I was employed by Clairol Incorporated for 17 years. I further declare that I have been involved in the development of hair colorant compositions for about 23 years.

- 2) I am a co-inventor of the above captioned patent application and am familiar with the subject matter contained therein. I am familiar with the Office Action dated July 21, 2008 and the references cited therein, namely German Application No. 4429344 to

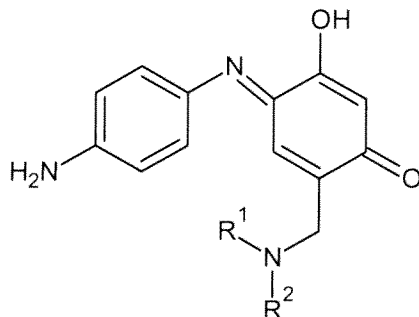
Rose et al. ("Rose") and German Application No. 4200534 to Konrad et al. ("Konrad").

- 3) In the pending Office Action, the Examiner rejects claims 1 and 25 under 35 USC 103(a) as being unpatentable over German Application No. 4429344 to Rose et al. ("Rose"). The Examiner asserts that Rose teaches aminomethylated dihydroxybenzene compounds and their use in oxidative hair dyeing. The Examiner acknowledges that the claimed compound requires an aminomethyl substitution at the 2-position, while the compound of Rose requires an aminomethyl substitution at the 4-position. The Examiner asserts, however, that the claimed compound is obvious over the compound of Rose, because the two compounds are structurally similar and hence expected to possess similar properties.
- 4) In the pending Office Action, the Examiner also rejects claims 1-3 and 25 under 35 USC 103(a) as being unpatentable over German Application No. 4200534 to Konrad et al. ("Konrad"). The Examiner asserts that Konrad teaches the compound 4-[(4-hydroxyphenyl) amino] methyl]-1, 3-benzenediol. The Examiner acknowledges that the claimed compound requires an aminomethyl substitution at the 2-position, while the compound of Konrad requires an aminomethyl substitution at the 4-position. The Examiner asserts, however, that the claimed compound is obvious over the compound of Konrad, because the two compounds are structurally similar and hence expected to possess similar properties.
- 5) First, to provide some background, there are generally two types of dye compounds, primary intermediate dye precursors and dye couplers. In a hair-coloring reaction, a primary intermediate dye precursor, such as p-phenylenediamine (or its derivatives), is oxidized in the hair shaft by an oxidizing agent (i.e., hydrogen peroxide) to form a reactive electrophilic species. The oxidized primary intermediate then reacts with a coupler compound, such as a 2-aminomethyl-1,3-benzenediol. The product of the

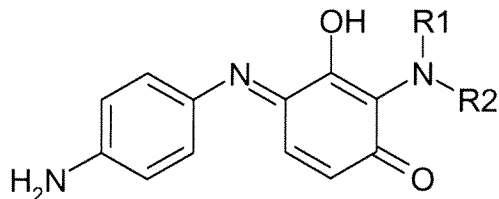
coupling reaction is a chromophore. The color imparted to hair depends on the ratio of the various primary intermediate dye precursors and couplers and on the total concentration of each dye. Shade formulation is very complicated, especially in shades containing multiple primary intermediate dyes and/or multiple couplers, as such shades involve many reactions.

- 6) I have studied the Rose and Konrad documents. Both the Rose compound and the Konrad compound are substituted with an aminomethyl group at the 4-position. The compounds of Rose and Konrad can therefore undergo coupling only at the 6-position (the unsubstituted 2-position is too sterically hindered by hydroxyl groups to undergo coupling). The claimed compounds, in contrast, are substituted with an aminomethyl group at the 2-position, rendering the 4-position and the 6-position available for coupling, allowing for additional coupling reactions (reactions at the 4-position as well as the 6-position), and allowing for the formation of additional chromophores, thereby affecting the ultimate color imparted to the hair.
- 7) Furthermore, when the compound of Rose or Konrad reacts with a primary intermediate dye precursor, such as p-phenylenediamine (or a derivative thereof), the chromophore generated is different from the chromophore generated from the reaction of the claimed compound with p-phenylenediamine:

Konrad/Rose Compound Coupled with p-phenylenediamine at 6-position



Claimed Compound Coupled with p-phenylenediamine at 6-position



- 8) Each of the above chromophores would impart a different color to hair due to the differing position of the -NR¹R² group. Specifically, when the -NR¹R² group is ortho to the hydroxyl group, the two groups participate in hydrogen bonding, which affects the color of the chromophore and stabilizes the chromophore. Each of the chromophores would thus impart a different color to hair. As such, the compounds of Konrad and Rose would not be expected to possess properties similar to the claimed compound, contrary to the assertions of the Examiner.

CONCLUSION

It is the Examiner's opinion that Rose and Konrad each teach aminomethylated dihydroxybenzene compounds and their use in oxidative hair dyeing. The Examiner acknowledges that the claimed compound requires an aminomethyl substitution at the 2-position, while the compound of Rose and the compound of Konrad requires an aminomethyl substitution at the 4-position. The Office asserts, however, that the claimed compound is obvious over the compound of Rose and the compound of Konrad, because the compounds are structurally similar and hence expected to possess similar properties.

In the above discussion, I explain that the compounds of Rose and Konrad can undergo coupling only at the 6-position, while the claimed compound can undergo coupling at the 4-position and the 6-position, allowing for additional coupling reactions (reactions at the 4-position as well as the 6-position), and allowing for the formation of additional chromophores, thereby affecting the ultimate color imparted to the hair. I also show that the chromophore generated from the reaction of the compound of Rose or Konrad with a primary intermediate dye precursor, such as p-phenylenediamine, is different from the chromophore generated from the reaction of the claimed compound with p-phenylenediamine. Namely, the position of the $-NR^1R^2$ group is different in each of the two chromophores; when the $-NR^1R^2$ group is ortho to the hydroxyl group, the two groups participate in hydrogen bonding, which affects the color of the chromophore and stabilizes the chromophore. Each of the chromophores would thus impart a different color to hair. Thus, in view of the above discussion, the claimed compound is not obvious over Rose or Konrad.

This declaration is made with the knowledge that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed true, and further that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 USC §1001 and may jeopardize the validity of the application or any patent issuing thereon.

Appl. No. 10/052,966
Docket No. G271ML
Amdt. dated October 21, 2008
Reply to Office Action mailed on July 21, 2008
Customer No. 27752

October 10, 2008

Date

Mu-III Lim

Mu-III Lim

Declarant